

TFT LCD Preliminary Specification

MODEL NO.: N121I3 - L03

Customer : _____

Approved by : _____

Note :

Liquid Crystal Display Division	
QRA Division.	OA Head Division.
Approval	Approval
	

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OPTOELECTRONICS CORP.

Issued Date: Oct. 14, 2005

Model No.: N12113 -L03

Preliminary**REVISION HISTORY**

Version	Date	Page (New)	Section	Description
Ver 1.0	Oct. 14,'05	All	All	Preliminary specification first issued.

1 GENERAL DESCRIPTION

1.1 OVERVIEW

N121I3 -L03 is a 12.1" TFT Liquid Crystal Display module with single CCFL Backlight unit and 20 pins LVDS interface. This module supports 1280 x 800 Wide-XGA mode and can display 262,144 colors. The optimum viewing angle is at 6 o'clock direction. The inverter module for Backlight is built in.

1.2 FEATURES

- Thin and light weight
- WXGA (1280 x 800 pixels) resolution
- 3.3V LVDS (Low Voltage Differential Signaling) interface with 1 pixel/clock
- Meet RoHS requirement

1.3 APPLICATION

- TFT LCD Notebook

1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	261.12 (H) x 163.2 (V) (12.1" diagonal)	mm	(1)
Bezel Opening Area	263.12 (H) x 165.2 (V)	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1280 x R.G.B. x 800	pixel	-
Pixel Pitch	0.204 (H) x 0.204 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	262,144	color	-
Transmissive Mode	Normally white	-	-
Surface Treatment	Hard coating (3H), glare type	-	-

1.5 MECHANICAL SPECIFICATIONS

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	275.3	275.8	276.3	mm	(1)
	Vertical(V)	177.4	178	178.6	mm	
	Depth(D)	-	4.9	5.2	mm	
Weight		-	260	275	g	(2)
		-	275	290	g	(3)

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) Weight without inverter & inverter bracket.

Note (3) Weight with inverter & inverter bracket.



2 ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

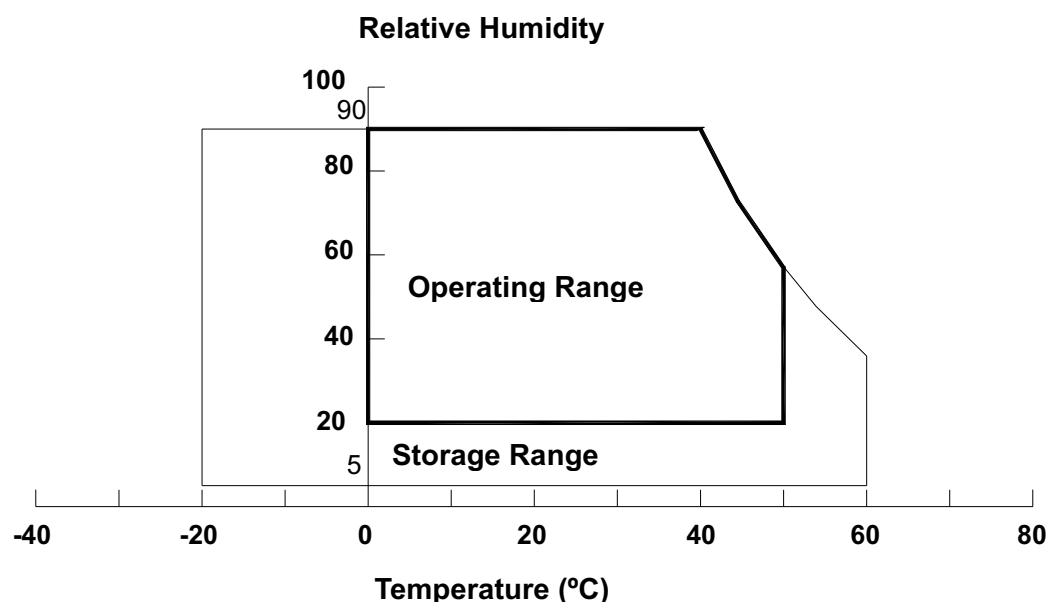
Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-20	+60	°C	(1)
Operating Ambient Temperature	T _{OP}	0	+50	°C	(1), (2)
Shock (Non-Operating)	S _{NOP}	-	200	G	(3), (5)
Vibration (Non-Operating)	V _{NOP}	-	1.5	G	(4), (5)

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. ($T_a \leq 40\text{ }^{\circ}\text{C}$).

(b) Wet-bulb temperature should be 39 °C Max. ($T_a > 40\text{ }^{\circ}\text{C}$).

(c) No condensation.



Note (2) The temperature of panel surface should be 0 °C Min. and 50 °C Max.

Note (3) 2ms, half sine wave, 1 time for $\pm X$, $\pm Y$, $\pm Z$.

Note (4) 10 ~ 500Hz, 0.5 Hr/cycle, 0.5hr each X, Y, Z,

Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	V _{CC}	-0.3	+4.0	V	(1)
Logic Input Voltage	V _{IN}	-0.3	V _{CC} +0.3	V	

2.2.2 BACKLIGHT UNIT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Lamp Voltage	V _L	-	2.5K	V _{RMS}	(1), (2), I _L = 6.0 mA
Lamp Current	I _L	3.0	6.5	mA _{RMS}	(1), (2)
Lamp Frequency	F _L	45	80	KHz	

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for lamp (Refer to Section 3.2 for further information)

3 ELECTRICAL CHARACTERISTICS

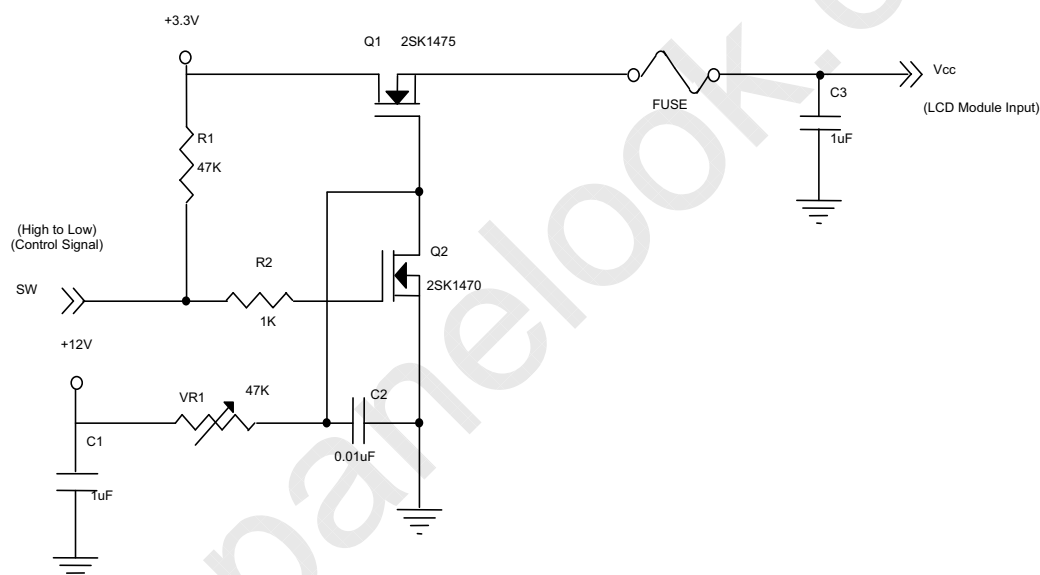
3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

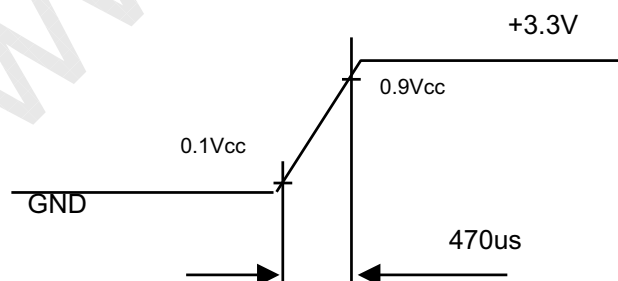
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V _{CC}	3.0	3.3	3.6	V	-
Ripple Voltage		V _{RP}	-		100	mV	-
Rush Current		I _{RUSH}	-	1.2	1.5	A	(2)
Power Supply Current	White	I _{CC}	-	(290)	-	mA	(3)a
	Black		-	(350)	-	mA	(3)b
Logical Input Voltage	“H” Level	V _{IL}	-	-	+100	mV	-
	“L” Level	V _{IH}	-100	-	-	mV	-
Terminating Resistor		R _T	-	100	-	Ohm	-
Power per EBL WG		P _{EBL}	-	TBD	-	W	(4)

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:



Vcc rising time is 470us



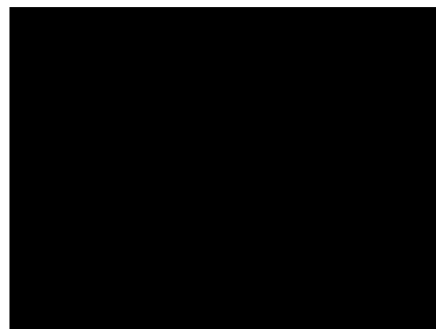
Note (3) The specified power supply current is under the conditions at V_{CC} = 3.3 V, Ta = 25 ± 2 °C, DC Current and f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern



Active Area

Note (4) The specified power are the sum of LCD panel electronics input power and the inverter input power. Test conditions are as follows.

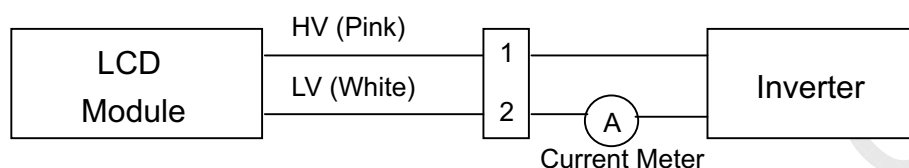
- (a) $V_{cc} = 3.3\text{ V}$, $T_a = 25 \pm 2\text{ }^{\circ}\text{C}$, $f_v = 60\text{ Hz}$,
- (b) The pattern used is a black and white 32 x 36 checkerboard, slide #100 from the VESA file "Flat Panel Display Monitor Setup Patterns", FPDMSU.ppt.
- (c) Luminance: 60 nits.
- (d) The inverter used is provided from O2Micro(www.o2micro.com). CMO doesn't provide the inverter in this product.

3.2 BACKLIGHT UNIT

Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Lamp Input Voltage	V _L	540	600	660	V _{RMS}	I _L = 6.0 mA
Lamp Current	I _L	2.0	6.0	6.5	mA _{RMS}	(1),(2)
		3.0				(1),(3)
Lamp Turn On Voltage	V _S	-	-	1,220 (25 deg C)	V _{RMS}	(4)
		-	-	1,380 (0 deg C)	V _{RMS}	(4)
Operating Frequency	F _L	45	-	80	KHz	(5)
Lamp Life Time	L _{BL}	10,000	-	-	Hrs	(7)
Power Consumption	P _L	-	3.6	-	W	(4), I _L = 6.0 mA

Note (1) Lamp current is measured by utilizing a high frequency current meter as shown below:



Note (2) for burst mode inverter design

Note (3) for continuous mode inverter design

Note (4) The voltage shown above should be applied to the lamp for more than 1 second after startup. Otherwise the lamp may not be turned on.

Note (5) The lamp frequency may generate interference with horizontal synchronous frequency from the display, and this may cause line flow on the display. In order to avoid interference, the lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible.

Note (6) $P_L = I_L \times V_L$

Note (7) The lifetime of lamp is defined as the time when it continues to operate under the conditions at Ta = 25 ± 2 °C and I_L = 6.0 mA_{RMS} until one of the following events occurs:

- (a) When the brightness becomes ≤ 50% of its original value.
- (b) When the effective ignition length becomes ≤ 80% of its original value. (Effective ignition length is defined as an area that the brightness is less than 70% compared to the center point.)

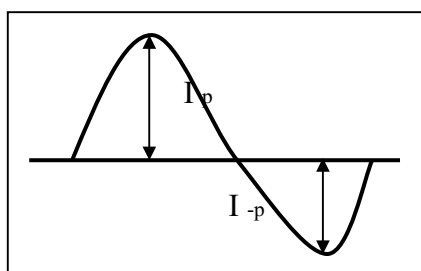
Note (8) The waveform of the voltage output of inverter must be area-symmetric and the design of the inverter must have specifications for the modularized lamp. The performance of the Backlight, such as lifetime or brightness, is greatly influenced by the characteristics of the DC-AC inverter for the lamp. All the parameters of an inverter should be carefully designed to avoid generating too much current leakage from high voltage output of the inverter. When designing or ordering the inverter please make sure that a poor lighting caused by the mismatch of the Backlight and the inverter (miss-lighting, flicker, etc.) never occurs. If the above situation is confirmed, the module should be operated in the same manners when it is installed in your instrument.

The output of the inverter must have symmetrical (negative and positive) voltage waveform and symmetrical current waveform.(Unsymmetrical ratio is less than 10%) Please do not use the inverter

which has unsymmetrical voltage and unsymmetrical current and spike wave. Lamp frequency may produce interface with horizontal synchronous frequency and as a result this may cause beat on the display. Therefore lamp frequency shall be as away possible from the horizontal synchronous frequency and from its harmonics in order to prevent interference.

Requirements for a system inverter design, which is intended to have a better display performance, a better power efficiency and a more reliable lamp. It shall help increase the lamp lifetime and reduce its leakage current.

- The asymmetry rate of the inverter waveform should be 10% below;
- The distortion rate of the waveform should be within $\sqrt{2} \pm 10\%$;
- The ideal sine wave form shall be symmetric in positive and negative polarities.



* Asymmetry rate:

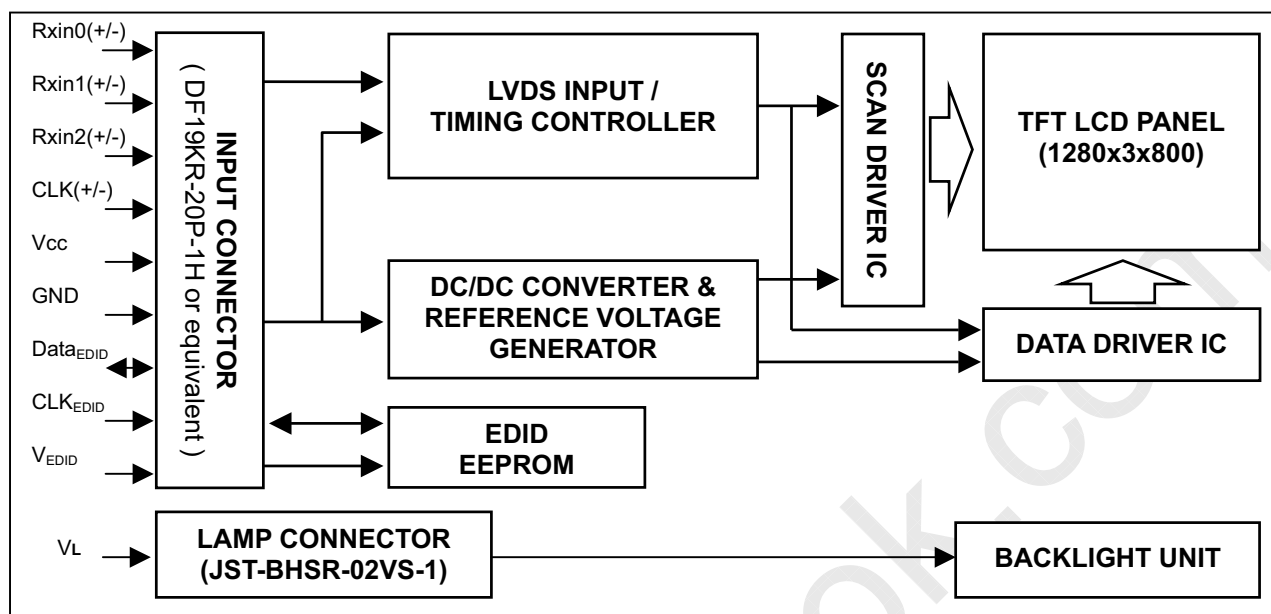
$$|I_p - I_{-p}| / I_{rms} * 100\%$$

* Distortion rate

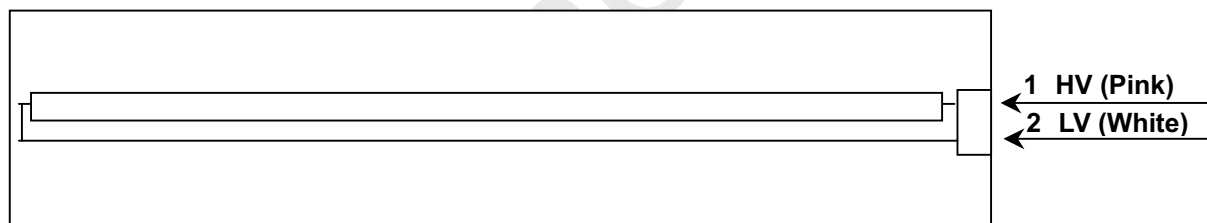
$$I_p \text{ (or } I_{-p}) / I_{rms}$$

4 BLOCK DIAGRAM

4.1 TFT LCD MODULE



4.2 BACKLIGHT UNIT



5 INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD MODULE

Pin	Symbol	Description	Polarity	Remark
1	VSS	Ground		-
2	VDD	Power Supply +3.3 V		-
3	VDD	Power Supply +3.3 V		-
4	V _{EDID}	DDC +3.3 V		
5	TEST	Panel Self Test		
6	CLK _{EDID}	DDC Clock		
7	Data _{EDID}	DDC Data		
8	Rxin0-	LVDS Differential Data Input	Negative	R0~R5,G0-
9	Rxin0+	LVDS Differential Data Input	Positive	
10	VSS	Ground		
11	Rxin1-	LVDS Differential Data Input	Negative	G1~G5,B0,B1
12	Rxin1+	LVDS Differential Data Input	Positive	
13	VSS	Ground		
14	Rxin2-	LVDS Differential Data Input	Negative	B2~B5,Hsync,Vsync,DE
15	Rxin2+	LVDS Differential Data Input	Positive	
16	VSS	Ground		
17	CLK-	LVDS Clock Data Input	Negative	LVDS Level
18	CLK+	LVDS Clock Data Input	Positive	
19	VSS	Ground	-	-
20	VSS	Ground	-	-

Note (1) Connector Part No.: DF19KR-20P-1H or equivalent

Note (2) User's connector Part No: DF19G-20S-1C or equivalent

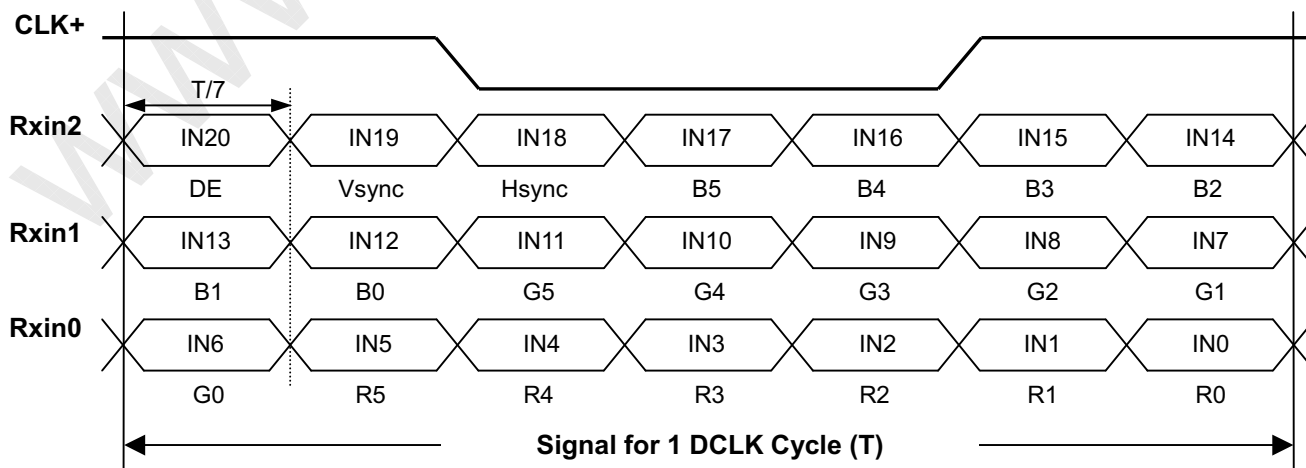
5.2 BACKLIGHT UNIT

Pin	Symbol	Description	Color
1	HV	High Voltage	Pink
2	LV	Ground	White

Note (1) Connector Part No.: JST-BHSR-02VS-1 or equivalent

Note (2) User's connector Part No.: JST-SM02B-BHSS-1-TB or equivalent

5.3 TIMING DIAGRAM OF LVDS INPUT SIGNAL



5.4 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color. The higher the binary input the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
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	Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
Gray Scale Of Green	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
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	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	
Gray Scale Of Blue	Blue(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	

Note (1) 0: Low Level Voltage, 1: High Level Voltage

5.5 EDID DATA STRUCTURE

The EDID (Extended Display Identification Data) data formats are to support displays as defined in the VESA Plug & Display and FPD1 standards.

Byte # (decimal)	Byte # (hex)	Field Name and Comments	Value (hex)	Value (binary)
0				
1				
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6				
7				
8				
9				
10				
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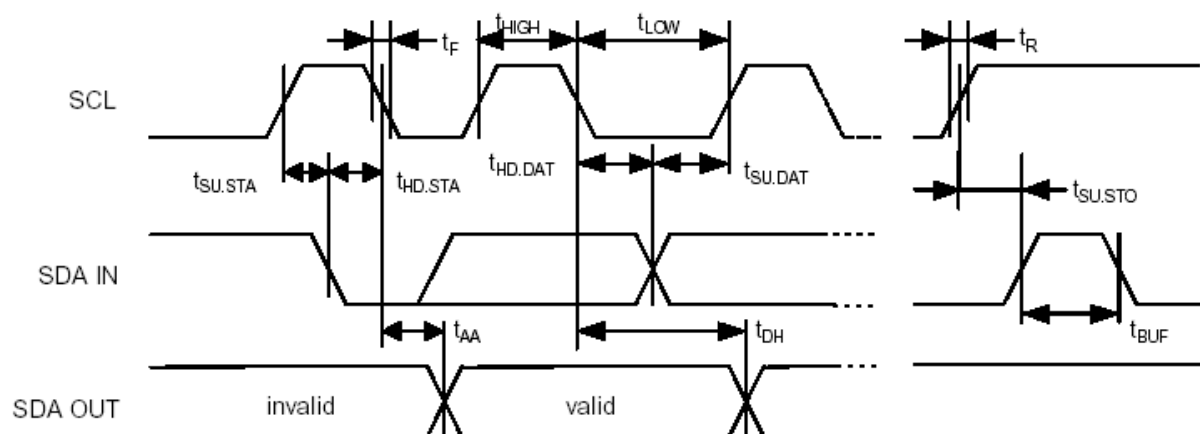
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5.6 EDID SIGNAL SPECIFICATION

(1) EDID Power

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Power supply voltage	Vcc	—	1.8	—	5.5	V



(2) DC characteristics

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Supply current Vcc=5.0V	Icc	READ at 100kHz	—	0.4	1.0	mA
Supply current Vcc=5.0V	Icc	WRITE at 100kHz	—	2.0	3.0	mA
Standby Current	ISB	Vin=Vcc or Vss	—	1.6	4.0	μ A
Input Leakage Current	ILI	Vin=Vcc or Vss	—	0.1	10	μ A
Onput Leakage Current	ILO	Vout=Vcc or Vss	—	0.1	10	μ A
Input Low Level	VIL	—	-1.0	—	Vcc x 0.3	V
Input High Level	VIH	—	Vcc x 0.7	—	Vcc+0.5	V
Output Low Level Vcc=3.0V	VOL1	IOL=3mA	—	—	0.4	V
Output Low Level Vcc=1.8V	VOL2	IOL=1.5mA	—	—	0.5	V

(3) AC characteristics (VCC=1.8~5.5V standard operation mode)

Parameter	Symbol	Min	Max	Unit
Clock Frequency, SCL	F _{SCL}	—	100	kHz
Clock Pulse Width Low	T _{LOW}	4.7	—	μs
Clock Pulse Width High	T _{HIGH}	4.0	—	μs
Noise Suppression Time	T _I	—	100	ns
Clock Low to Data Out Valid	T _{AA}	0.1	4.5	μs
Time the bus must be free before a new transmission can start	T _{BUF}	4.7	—	μs
Start Hold Time	T _{HD.STA}	4.7	—	μs
Start Set-up Time	T _{SU.STA}	4.7	—	μs
Data in Hold Time	T _{HD.DAT}	0	—	μs
Data in Set-up Time	T _{SU.DAT}	200	—	ns
Inputs Rise Time	T _R	—	1.0	μs
Inputs Fall Time	T _F	—	300	ns
Stop Set-up Time	T _{SU.STO}	4.7	—	μs
Data Out Hold Time	T _{DH}	100	—	ns
Write Cycle Time	T _{WR}	—	10	ms

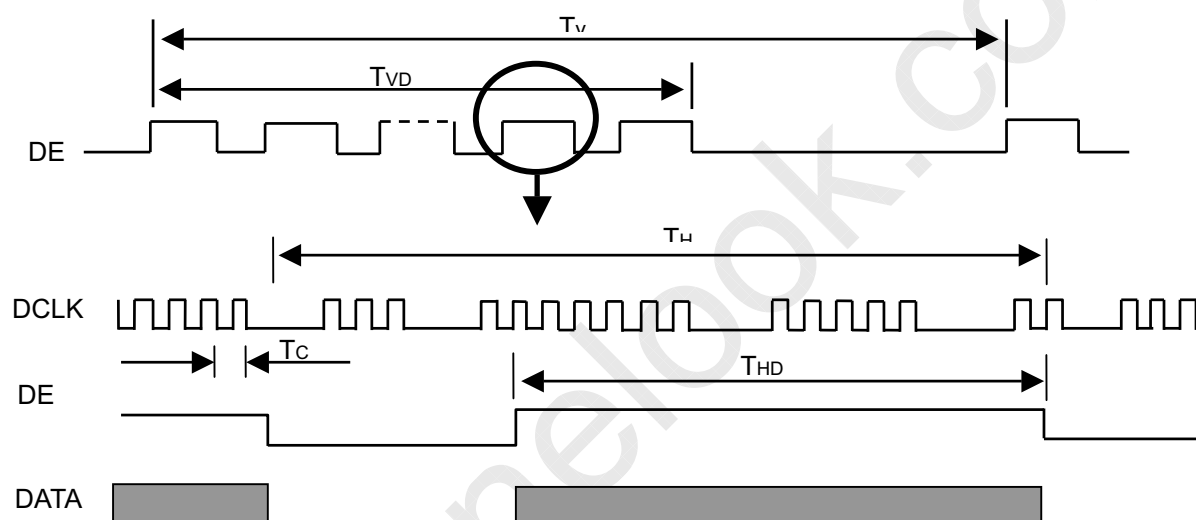
6 INTERFACE TIMING

6.1 INPUT SIGNAL TIMING SPECIFICATIONS

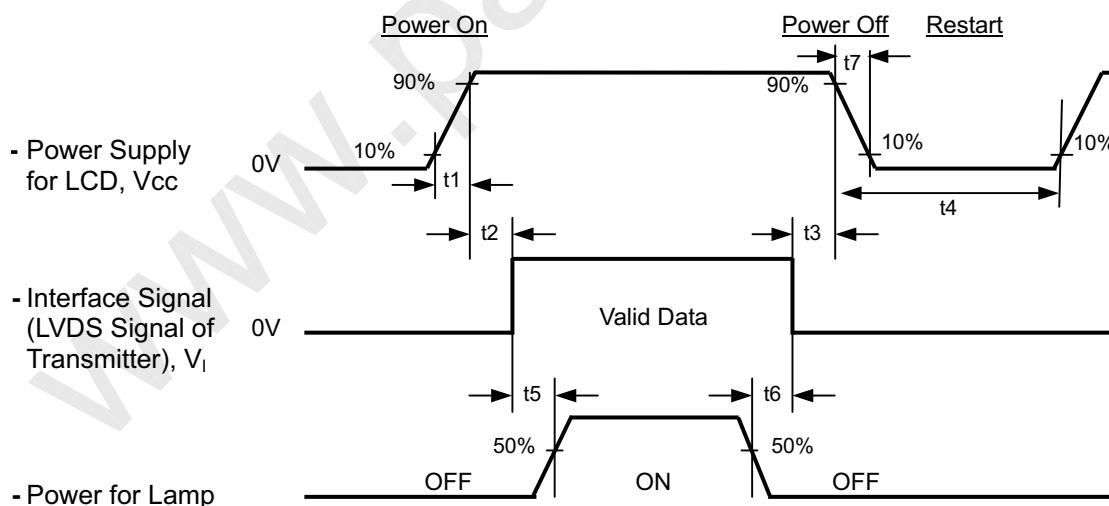
The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	-	71	73	MHz	-
DE	Vertical Total Time	TV	802	823	840	TH	-
	Vertical Addressing Time	TVD	800	800	800	TH	-
	Horizontal Total Time	TH	1380	1440	1450	Tc	-
	Horizontal Addressing Time	THD	1280	1280	1280	Tc	-

INPUT SIGNAL TIMING DIAGRAM



6.2 POWER ON/OFF SEQUENCE



Timing Specifications:

$$0.5\text{ms} < t_1 \leq 10 \text{ msec}$$

$$0 < t_2 \leq 50 \text{ msec}$$

$$0 < t_3 \leq 50 \text{ msec}$$

$$t_4 \geq 500 \text{ msec}$$

$$t_5 \geq 200 \text{ msec}$$

$$t_6 \geq 200 \text{ msec}$$

Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD Vcc to 0 V.

Note (3) The Backlight inverter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight inverter power must be turned off before the power supply for the logic and the interface signal is invalid.

Note (4) Sometimes some slight noise shows when LCD is turned off (even backlight is already off). To avoid this phenomenon, we suggest that the Vcc falling time had better to follow

$$t_7 \geq 5 \text{ msec}$$

7 OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

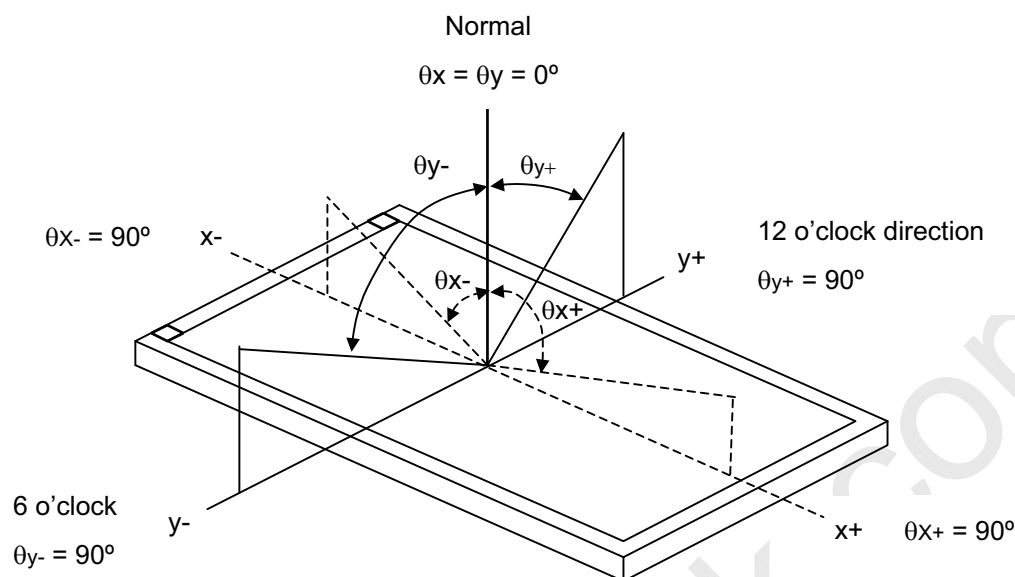
Item	Symbol	Value	Unit
Ambient Temperature	T _a	25±2	°C
Ambient Humidity	H _a	50±10	%RH
Supply Voltage	V _{CC}	3.3	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Inverter Current	I _L	6.0	mA
Inverter Driving Frequency	F _L	61	KHz
Inverter	Sumida-H05-4915		

The measurement methods of optical characteristics are shown in Section 7.2. The following items should be measured under the test conditions described in Section 7.1 and stable environment shown in Note (6).

7.2 OPTICAL SPECIFICATIONS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	(300)	(500)	-	-	(2), (5)
Response Time		T _R		-	(5)	(10)	ms	(3)
		T _F		-	(11)	(16)	ms	
Luminance of White		L _{AVE}		(150)	(180)	-	cd/m ²	(4), (5)
Color Chromaticity	Red	R _x		Typ.- 0.03	TBD	Typ.+ 0.03	-	(1), (5)
		R _y			TBD		-	
	Green	G _x			TBD		-	
		G _y			TBD		-	
	Blue	B _x			TBD		-	
		B _y			TBD		-	
	White	W _x	0.313		-			
		W _y	0.329		-			
	Color Gamut	C.G%	(42)		(45)		-	
White Variation of 5 Points		δW _{5p}	$\theta_x=0^\circ, \theta_y=0^\circ$	(80)	-	-	%	(5),(6)
White Variation of 13 Points		δW _{13p}	(BM-5A)	(65)	-	-	%	
Viewing Angle	Horizontal	θ _x +	CR≥10	(40)	(45)	-	Deg.	(1), (5)
		θ _x -		(40)	(45)	-		
	Vertical	θ _y +		(15)	(20)	-		
		θ _y -		(40)	(45)	-		

Note (1) Definition of Viewing Angle (θ_x , θ_y):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

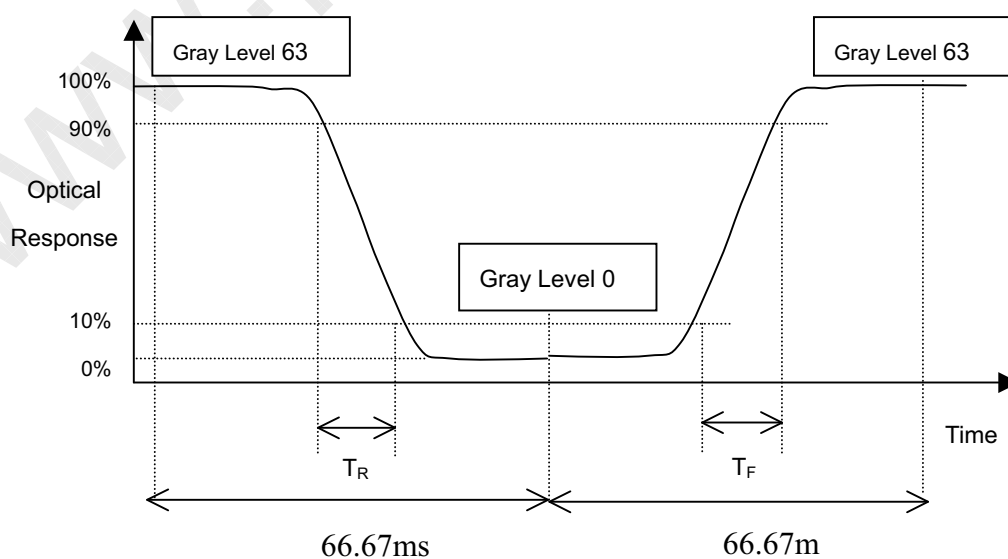
L_{63} : Luminance of gray level 63

L_0 : Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R , T_F):



Note (4) Definition of Average Luminance of White (L_{AVE}):

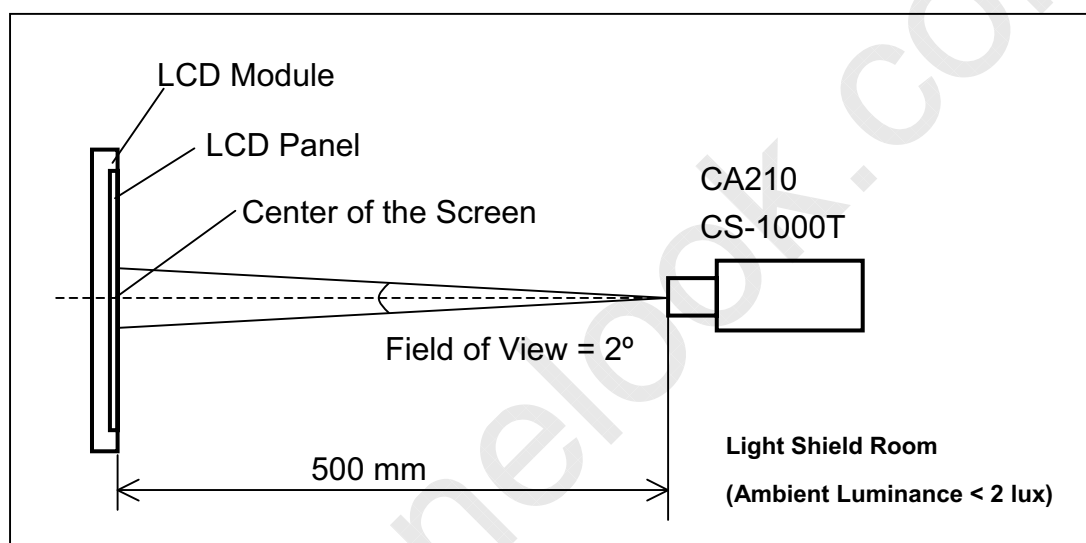
Measure the luminance of gray level 63 at 5 points

$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

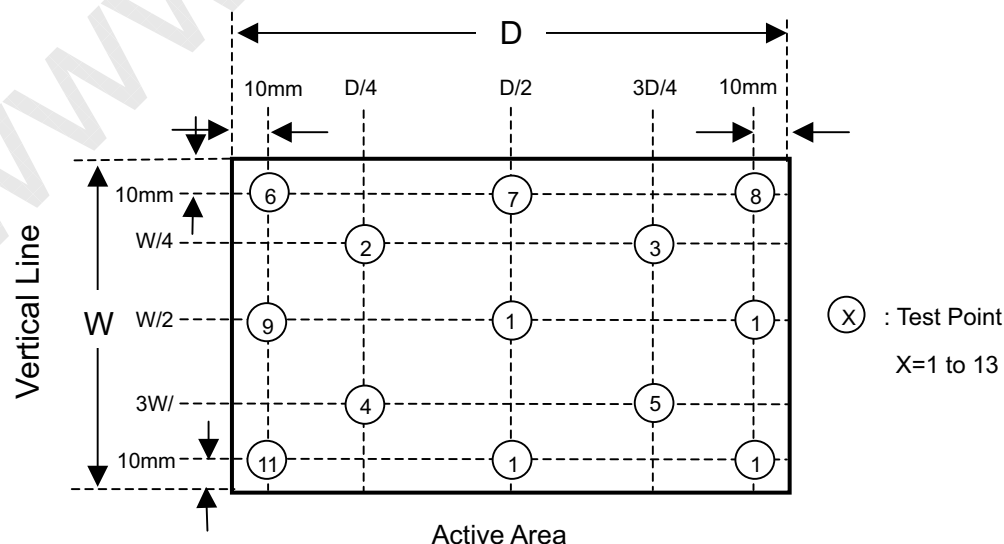
**Note (6) Definition of White Variation (δW):**

Measure the luminance of gray level 63 at 5 points

$$\delta W_{5p} = \text{Minimum } [L(1), L(2), L(3), L(4), L(5)] / \text{Maximum } [L(1), L(2), L(3), L(4), L(5)]$$

$$\delta W_{13p} = \text{Minimum } [L(1) \sim L(13)] / \text{Maximum } [L(1) \sim L(13)]$$

Horizontal Line



Note (7) Definition of color gamut (C.G%):

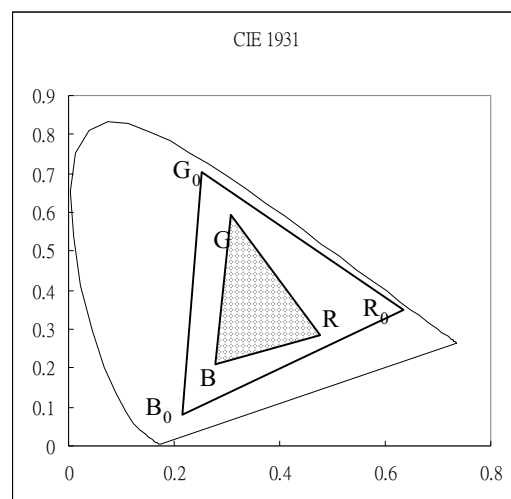
$$C.G\% = R G B / R_0 G_0 B_0 \cdot 100\%$$

R_0, G_0, B_0 : color coordinates of red, green, and blue defined by NTSC, respectively.

R, G, B : color coordinates of module on 63 gray levels of red, green, and blue, respectively.

$R_0 G_0 B_0$: area of triangle defined by R_0, G_0, B_0

$R G B$: area of triangle defined by R, G, B



8 PRECAUTIONS

8.1 HANDLING PRECAUTIONS

- (1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
- (2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
- (3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.
- (5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
- (6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
- (9) Do not disassemble the module.
- (10) Do not pull or fold the lamp wire.
- (11) Pins of I/F connector should not be touched directly with bare hands.

8.2 STORAGE PRECAUTIONS

- (1) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (2) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
- (3) It may reduce the display quality if the ambient temperature is lower than 10 °C. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.

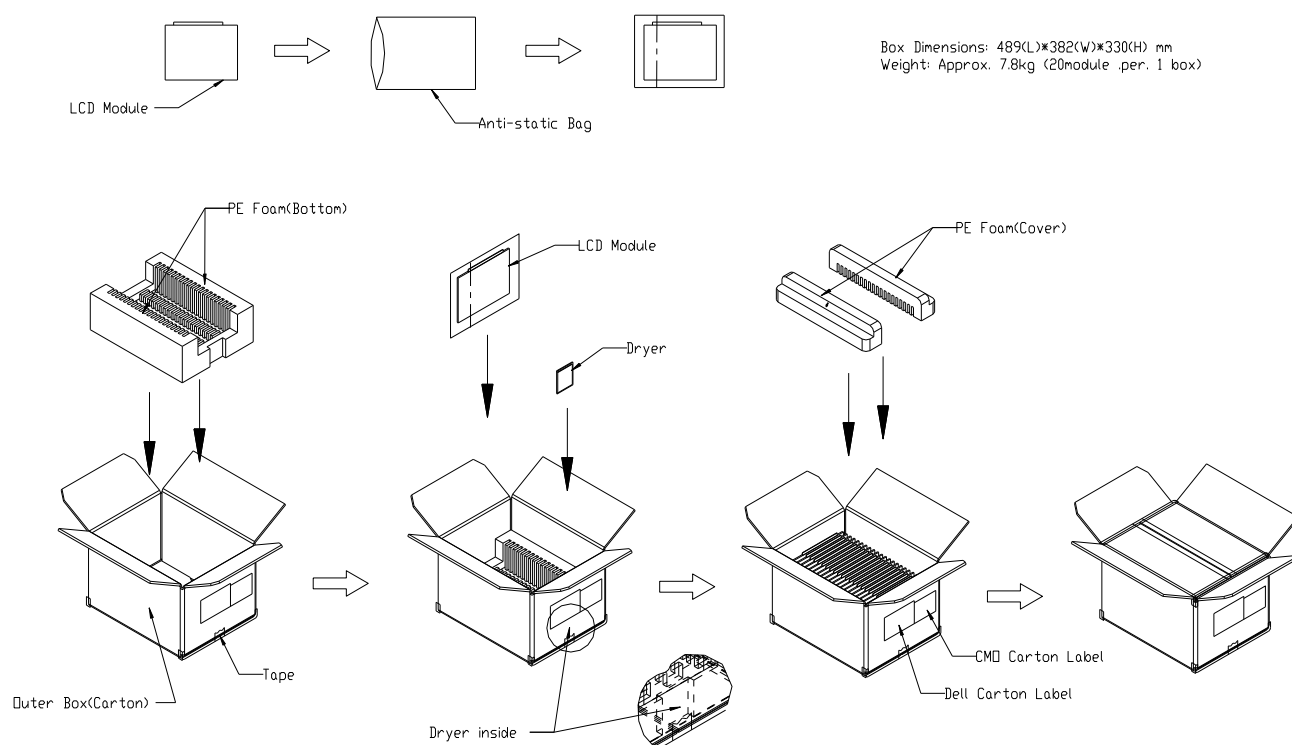
8.3 OPERATION PRECAUTIONS

- (1) Do not pull the I/F connector in or out while the module is operating.
- (2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
- (3) The startup voltage of Backlight is approximately 1000 Volts. It may cause electrical shock while assembling with inverter. Do not disassemble the module or insert anything into the Backlight unit.

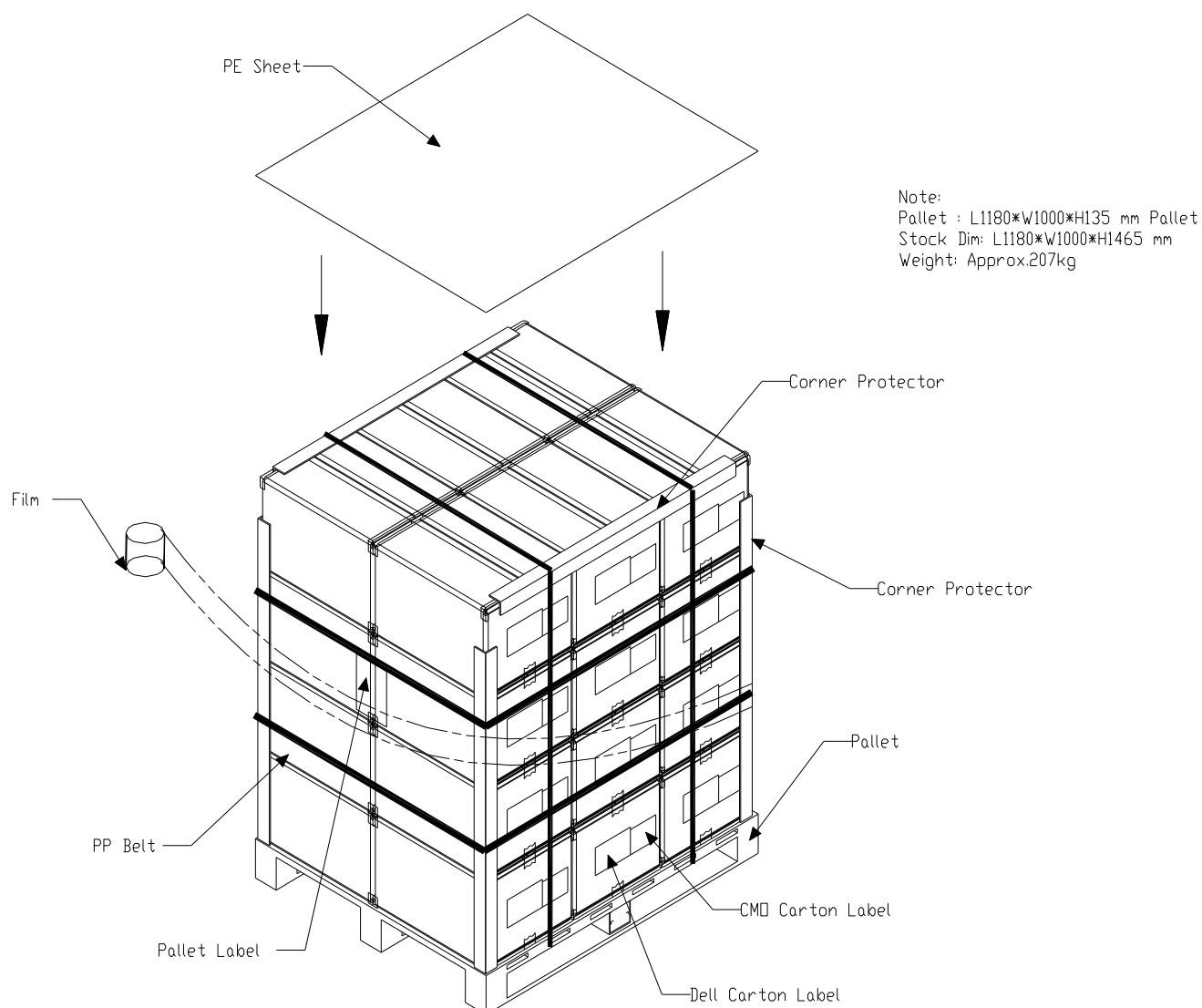


9 PACKING

9.1 CARTON



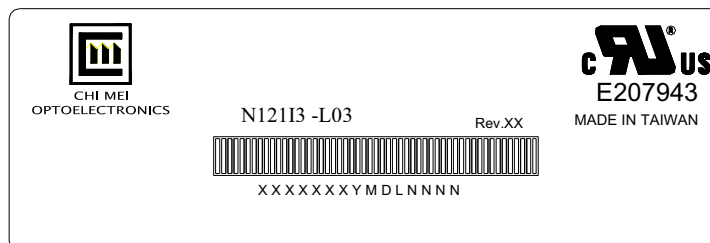
9.2 PALLET



10 DEFINITION OF LABELS

10.1 CMO MODULE LABEL

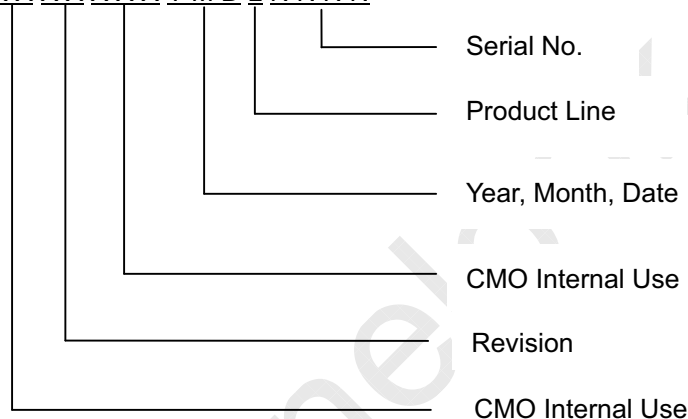
The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Model Name: N121I3 - L03

(b) Revision: Rev. XX, for example: C1, C2 ...etc.

(c) Serial ID: X X X X X X Y M D L N N N N



Serial ID includes the information as below:

(a) Manufactured Date: Year: 1~9, for 2001~2009

Month: 1~9, A~C, for Jan. ~ Dec.

Day: 1~9, A~Y, for 1st to 31st, exclude I, O and U

(b) Revision Code: cover all the change

(c) Serial No.: Manufacturing sequence of product



Issued Date: Oct. 14, 2005

Model No.: N12113 -L03

Preliminary

10.2 CARTON LABEL

PO.NO. _____	
Part ID. _____	
Model Name _____	
Carton ID. _____	Quantities _____

10.3 CUSTOMER CARTON LABEL

PKG ID (3S)124161241729112345609886C20 	 REV.A06
DP/N 03J849	 Vendor ID Loc Id 12416 12416
BOX Qty 20 Made in Taiwan	 Mfg Id 70896

Type J Label

- Verdana font or equivalent,bold
- 20pt.-all fields
- 203 DPI printer minimum
- Code 128B
- 10-15 mil minimum narrow bar
- .75"minimum barcode height
- .10" or greater quiet zone
- 4.0" x 6.0" label size
- Brady THT -25-402-1 or equivalent
- Brady R6107 series ribbon or equivalent



Issued Date: Oct. 14, 2005

Model No.: N12113 -L03

Preliminary

10.4 CUSTOMER PALLET LABEL

FROM : CMO Corporation Tainan, Taiwan 744 R.O.C		TO: DELL COMPUTER 2128 West Braker Austin TX	
P.O. NUMBER 12345678			
		DELL P/N 12345	
COUNTRY OF ORIGIN TW			
		PACKING LIST# 1234567890123	
PACKING LIST QTY 654321			
		DESTINATION MAS LOC 60	
DESTINATION LOCATION B4			
AIRBILL NUMBER 12345678901234567890 			
PKG CNT 999 OF 999	BOX CNT 12345	REVISION A00-00	SHIP DATE Apr 29, 2003
PART DESCRIPTION XXXXXXXXXXXXXXXXXXXX 12345678901234567890123456789012345678901			

Type K Label

- Verdana font or equivalent, bold
- 12pt.-all descript fields
- 10pt.-all data fields
- 203 DPI printer minimum
- Code 128B
- 10 mil minimum narrow bar
- .30-.50" minimum barcode height
- .10" or greater quiet zone
- 4.0" x 6.5" label size
- Brady THT -78-402-.9 or equivalent
- Brady R6107 series ribbon or equivalent

